| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/668,764 | 09/23/2003 | John R. Douceur | 50037.33USD1 | 3059 |

7590    10/17/2005

Attn: Joshua W. Korver
MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903

| EXAMINER |
|---|
| OPIE, GEORGE L |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2194 | |

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

| | Application No. | Applicant(s) |
|---|---|---|
| | 10/668,764 | DOUCEUR ET AL. |
| **Office Action Summary** | Examiner | Art Unit | |
| | GEORGE L. OPIE | 2194 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE __3__ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *23 September 2003*.

2a)☐ This action is **FINAL.**    2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *51-67* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *51-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

## DETAILED ACTION

This Office Action is responsive to Applicant's Preliminary Amendment, submitted 23 September 2003, in which claims 1-50 and 68-71 were cancelled. Hence, claims 51-67 are currently pending.

1.     Request for copy of Applicant's response on floppy disk:
Please help expedite the prosecution of this application by including, along with your amendment response in paper form, an electronic file copy in WordPerfect, Microsoft Word, or in ASCII text format on a 3½ inch IBM format floppy disk. Please include all pending claims along with your responsive remarks.  Only the paper copy will be entered -- your floppy disk file will be considered a duplicate copy.  Signatures are not required on the disk copy.  The floppy disk copy is not mandatory, however, it will help expedite the processing of your application. Your cooperation is appreciated.

## 2.     Obviousness-type double patenting rejection

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. CIT. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re van Ornurn, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Uogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington,418 F.2d 528, 163 USPQ 644 (CCPA 1969).

"Double patenting rejection of application claims was fully justified where applicant, in course of expanding first application to disclose enough more by way of details, alternatives, and additional uses to support broad, dominating, generic claims in later applications, has disclosed no additional invention or discovery other than that what was already claimed in patent on first application; there is significant  difference between justifying broadening of claims and disclosing additional inventions." *In re Van Ornum*, 214 USPQ (CCPA 1982).

Claims 51-67 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-40 of copending Application No. 08/931,861, filed 16 September 1997, now U.S. Patent 6,658,648.

The instant claims (51-67) were previously presented as part of the claims in the parent (copending application 08/931,861) patent 6,658,648 and, claims 51-67,

the instant claims were in the group of claims which Appplicant elected for prosecution in the referenced parent application/patent. Consequently, the obviousness-type double patenting rejection can be made in this case, because the restriction in the parent only precludes a double patenting rejection on the nonelected claims.

Although the conflicting claims are not identical, they are not patentably distinct from each other because of corresponding language that recites many of the same elements and functions, i.e., *"calculating a locality of reference ... for each of the number of different program layouts"*, *"executed inn a computer system with a page architecture, each page having a multiplicity of memory locations"*, *"calculating the working set ... size of the program layout"* and *"combining the calculated metric values for the selected starting memory locations as an indication of the locality of reference of the program layout"*.

The claimed differences would be obvious to an engineer of ordinary skill because the instant claims are merely subsets of the claims recited in the previously patented invention, e.g., **independent claim 51 of the instant application claims**:

```
A computer-readable medium containing instructions for causing a
computer system to evaluate locality of references for a layout
of a computer program, the computer program to be executed by a
computer system with a page architecture, each page having memory
locations, by:
for each of a plurality of selected memory locations of a page,
  estimating a working set size of the layout when the layout is
positioned to start at that memory location; and
  combining the estimated working set size as an indication of the.
locality of references of the layout of the computer program.  ·
```

## as opposed to

```
A computer-implemented method of improving a working set metric value of
a program image, the method comprising:
performing a first phase of improving a locality of references of the
program image, including:
determining a number of different program layouts of the program image
to be generated for the program image;
generating the number of different program layouts of the program image;
calculating a locality of reference metric value for each of the number
of different program layouts;
selecting the generated program layout of the program image having a
most desirable locality of references metric value;
returning the selected program layout;
```

performing a second phase of modifying the program image such that a
placement of its basic blocks in relation to page boundaries is improved
in a computer system with a page architecture, including:
receiving the selected program layout;
recursively reordering basic blocks of the selected program layout;
calculating the working set metric value for each reordered program
layout; and
terminating the recursive reordering when a termination condition is
satisfied, such that the working set metric value of the reordered
program layout is reduced
wherein calculating a locality of reference metric value comprises:
selecting a plurality of starting memory locations in a computer system
with a page architecture, each page having a multiplicity of memory
locations;
for each of the selected starting memory locations, performing the
following:
positioning the program layout to start at the selected starting memory
location;
calculating a metric value indicating a working set size of the program
layout; and
combining the calculated metric values for the selected starting memory
locations as an indication of the locality of reference of the program
layout

**as claimed in dependent claim 4 of the previously patented invention.**

Because the instant claims are mere variations/additions on the limitations from
the set of elements and functions claimed in the previously patented invention,
such modifications would be readily apparent to one of ordinary skill in the art.


### Terminal Disclaimer

3.      A timely filed terminal disclaimer in compliance with 37 C.F.R. ' 1.321(b)
would overcome an actual or provisional rejection on this ground provided the
conflicting application or patent is shown to be commonly owned with this
application.  See 37 C.F.R. ' 1.78(d).

Effective January 1, 1994, a registered attorney or agent of record may
sign a terminal disclaimer.  A terminal disclaimer signed by the assignee must
fully comply with 37 CFR 3.73(b).


4.                    Allowable Subjectmatter
Claims 66-67 are objected to as being dependent upon a rejected base claim,
but would be allowable if rewritten in independent form including all of the
limitations of the base claim and any intervening claims.

5.      The U.S. Patents used in the art rejections below have been provided as text documents which correspond to the U.S. Patents.  The relevant portions of the text docs are cited according to page and line numbers in the rejections infra. For the convenience of Applicant, the cited sections are highlighted in the *docs*.

6.                      Claim Rejections - 35 U.S.C. § 103
        The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.      Claims 51-65 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Breternitz et al. (U.S. Patent 5,889,999) in view of Elliott et al (U.S. Patent 5,721,719).

As to claim 51, Breternitz teaches a method for evaluating the locality of references for a layout of a computer program (analysis of correlations and dependencies between instructions in a computer program, p6 26-42). Breternitz does not explicitly disclose the additional limitations detailed below.

Elliott (p7 34-53) teaches the measuring of the actual working set (AWS) in bytes mapped onto the memory pages which corresponds to the limitation that for each of a plurality of memory locations of a page, calculating a metric value indicating a working set size of the layout when the layout is positioned to start at that memory location.  It would have been obvious to combine the AWS size determination with Breternitz because Elliott's analysis tool facilitates a page-wise optimization with respect to the working set layout, and combining the working set size would flow from Elliott's teachings as an indication of the program's layout (show the size and placement of selected data structures, to show locality, p14 50-55.

As to claims 52-56, Elliott teaches the stipulations for designating memory locations (memory allocations with data analyzer 504 in the WS log, p14 3-27).

As to claim 57, Elliott (p9 33-40) teaches the working set computations taken over a range of data, which would suggest the averaging of set data as claimed.

As to claim 58, note the discussion of claim 51 above.  Claim 58 uses the claim 51 layout size computations to assess improvement rate for working set reduction.  The limitations of estimating WS change from one layout to another and the amount of time for this process would have naturally flowed from the layout analysis taught by Breternitz as modified by Elliott.  It would have been a routine matter for one skilled in the art to combine the WS change with time for that change in order to yield a rate of change for the improvement. Eliot p9 33-40.

As to claim 59, see the discussion of claim 57 supra.

As to claims 60-61, Breternitz teaches a system involving a count of the execution of the program, p32 which corresponds to the recitations regarding the evaluating the number of times substeps are performed.

As to claim 62, note the discussions in 59-61 above.  Claim 62 is a combination of claims 59-61, and the rejections set forth with respect to each limitation would collectively apply to make claim 62 obvious.

As to claim 63, note the rejection of claim 58 above.

As to claim 64, Breternitz (p27 3-12 and p30-32) teaches the terminating of operations when the rate of improvement exceeds a threshold. It would have been obvious to combine the threshold stipulation with the teachings of Breternitz as modified by Elliott because the limit on a system's processing ensures that the computing progresses with a definite conclusion.

As to claim 65, Elliott teaches the filtering by working set size analysis of other layouts (sort WS improvements with data analysis displaying histograms,p14 50-55).


8.     The prior art of record and not relied upon is considered pertinent to the applicant's disclosure.  Specifically, the below reference(s) will also have relevancy to one or more elements of the Applicant's claimed invention as follows:

U.S. Patent No. 5,664,191 to Davidson et al. which teaches the memory measurements showing program sizes;

U.S. Patent No. 5,212,794 to Pettis et al. which teaches the statistical analysis of computer code layouts; and,
U.S. Patent No. 5,062,055 to Chinnaswamy et al. which teaches the working set calculation metrics for tuning software structures and operations.

**Contact Information:**


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system.

Status information for published applications may be obtained from either Private-PAIR or Public-PAIR.

Status information for unpublished applications is available through Private-PAIR only.

For more information about the PAIR system, see   http://pair-direct.uspto.gov.

Should you have questions regarding access to the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


All responses sent by U.S. Mail should be mailed to:
**Commissioner for Patents**
**PO Box 1450**
**Alexandria, VA 22313-1450**


Hand carried responses should be delivered to the *Customer Service Window* (Randolph Building, 401 Dulany Street, Alexandria, Virginia 22314) and, if submitting an electronic copy on floppy or CD, to expedite its processing, please notify the below identified examiner prior to delivery, so that the Applicant can "handoff" the electronic copy directly to the examiner.

The fax number (571) 273-8300 should be used for all fax transmissions to the Office.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist at **(571) 272-2100.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Opie at (571) 272-3766 or via e-mail at *George.Opie@uspto.gov*.  Internet e-mail should not be used where sensitive data will be exchanged or where there exists a possibility that sensitive data could be identified unless there is an express waiver of the confidentiality requirements under 35 U.S.C. 122 by the Applicant.  Sensitive data includes confidential information related to patent applications.